

**REMARKS**

Applicant respectfully requests that the application be reconsidered in view of the above amendments and the following remarks. In the non-final Office Action, dated March 31, 2005, the Examiner has required restriction, under 35 U.S.C. §121, to either claims 1-26 and 33-44 (Group I) or claims 27-32 and 45-53 (Group II). In view of a telephonic election, the Examiner has withdrawn claims 27-32 and 45-53. The Examiner further rejected claims 1, 9-15, 33, 43 and 44 under 35 U.S.C. §102(e) as allegedly being anticipated by U. S. Patent No. 6,678,379 (hereinafter "MAYERS"). The Examiner also rejected claims 2-8, 16-26 and 34-42 under 35 U.S.C. §103(a) as allegedly being unpatentable over MAYERS in view of U.S. Patent No. 6,097,696 (hereinafter "DOVERSPIKE").

By way of this amendment, Applicant has amended claims 1, 13, 14, 16, 24, 25 and 33 to improve form. Reconsideration of the outstanding rejection of claims 1-26 and 33-44 is respectfully requested in view of the amendments above and the following remarks.

On page 2, the Office Action has required restriction, under 35 U.S.C. §121, to either claims 1-26 and 33-44 (Group I), allegedly drawn to key distribution in a multi-node communication network using cryptography, or claims 27-32 and 45-53 (Group II), allegedly drawn to key distribution in an optical network using cryptography. The Office Action alleges that these inventions are distinct because they are related as combination and subcombination. In support of this allegation of distinctness, the Office Action alleges that "the combination as claimed does not require the particulars of the subcombination as claimed because a network may or may not be an optical network" and the "subcombination has separate utility such as fiber optic networks." Applicant respectfully traverses the restriction requirement and submits

that the allegations of the Office Action fail to demonstrate that the claims or Groups I and II are distinct.

In order to establish that combination and subcombination inventions are distinct, two-way distinctness must be demonstrated. M.P.E.P. § 806.05(c). To demonstrate two-way distinctness, the Examiner must show that 1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and 2) the subcombination has utility either by itself or in other and different relations. See M.P.E.P. § 806.05(c). When the Examiner does not demonstrate these factors, then restriction is improper using a combination-subcombination basis. See M.P.E.P. § 806.05(c).

To demonstrate factor 1) of the two-way test for distinctness, the Office Action alleges that “the combination as claimed does not require the particulars of the subcombination as claimed because a network may or may not be an optical network.” Applicant respectfully disagrees with this assertion and submits that claim 5 of Group I does require the particulars of claim 45 of Group II. Claim 45 recites the single feature “establishing a first key distribution path through a first series of links and optical switches of the optical network.” Claim 5 recites, among other features, “establishing a first data distribution path through the network...wherein the first data distribution path comprises a plurality of links and switches.” Since subcombination claim 45 recites a single feature that is also substantially recited in combination claim 5, Applicant submits that combination claim 5 does require the particulars of claim 45. Therefore, the Office Action has not demonstrated factor 1) above.

To demonstrate factor 2) of the two-way test for distinctness, the Office Action alleges that “the subcombination has separate utility such as fiber optics networks.” Applicant, however, submits that combination claim 2, of Group I, recites “wherein the network comprises

an optical network” which, as one skilled in the art will recognize, broadly encompasses fiber optic networks. The Office Action’s allegation of separate utility for the claims of Group II, therefore, merely restates a utility associated with a claim of Group I. The Office Action, thus, has not demonstrated that the subcombination (Group II) has separate utility than the combination (Group I).

In view of the remarks above, Applicant submits that the Office Action has failed to demonstrate either factors of the test for two-way distinctness. Withdrawal of the restriction requirement is, therefore, respectfully requested.

On page 3, the Office Action rejects pending claims 1, 9-15, 33, 43 and 44 under 35 U.S.C. § 102(e) as allegedly being anticipated by MAYERS. Applicant respectfully traverses.

Amended independent claim 1, for example, recites a method that includes “establishing a first data distribution path through the network, the network comprising at least one switch and one link,” “determining whether eavesdropping has occurred on the first data distribution path using quantum cryptography,” and “establishing a second data distribution path through the network based on the eavesdropping determination, wherein the second data distribution path comprises a different route through the network than the first data distribution path.”

A proper rejection under 35 U.S.C. § 102 requires that a single reference teach every aspect of the claimed invention. Any feature not explicitly taught must be inherently present. See M.P.E.P. § 2131. MAYERS does not disclose or suggest the combination of features recited in Applicant’s amended claim 1.

For example, MAYERS does not disclose or suggest “establishing a second data distribution path through the network based on the eavesdropping determination, wherein the second data distribution path comprises a different route through the network than the first data

distribution path,” as recited in claim 1. The Office Action relies on column 3, lines 12-67 of MAYERS for allegedly disclosing the establishment of a second data distribution path (Office Action, pg. 4). Applicant respectfully submits that this section of MAYERS does not disclose or suggest the feature recited above.

The most pertinent portion of column 3, lines 12-67 of MAYERS discloses:

The sending party 301 and receiving party 302 extract test bits at random from the resulting random number series, and check whether or not they are correct by collating the parity of the bit values for each bit. If this test produces the correct parities for a sufficient number of bits, it can be concluded with a probability close to 1 that there is no eavesdropping activity, in which case the test bits are discarded and a shared key is produced from the remaining random series of bits. But when bits are discovered that do not match, it is concluded that there is an eavesdropper 308, and the communication session is abandoned. The session is restarted from the beginning after checking the quantum channel 305 or switching to another quantum channel 305a.

The above process allows a shared key to be produced between the sending and receiving parties while confirming that there is no eavesdropper.

This portion of MAYERS, thus, discloses the detection of eavesdropping over a quantum channel 305 using quantum cryptography, and switching to another quantum channel 305a if eavesdropping is detected over quantum channel 305. At column 2, lines 7-9, MAYERS further discloses that quantum channel 305 consists of a propagation mode “in an optical fiber or in free space.” Quantum channels 305 and 305a, thus, comprise different propagation modes (e.g., different channel wavelengths) for transmitting quantum signals over a single path that comprises either an optical link or a free space link (see FIG. 1 which depicts the use of channels 305 and 305a for point-to-point transmission over a single path between source 103 and measuring device 304). The channel switching disclosed in MAYERS, therefore, discloses switching between a first channel over a path to a second channel over the same path based on the detection of eavesdropping on the first channel, and does not disclose switching between

different paths through the network. MAYERS, thus, does not disclose, or even suggest, “establishing a second data distribution path through the network based on the eavesdropping determination, wherein the second data distribution path comprises a different route through the network than the first data distribution path,” as recited in amended claim 1.

Claims 9-12 depend from claim 1 and, therefore, patentably distinguish over MAYERS for at least the reasons set forth above with respect to claim 1.

Amended independent claims 13 and 14 recite similar features to those discussed above with respect to claim 1. Claims 13 and 14, therefore, patentably distinguish over MAYERS for at least reasons similar to reasons set forth above with respect to claim 1.

Independent claim 15 recites “a switch configured to establish a first encryption key distribution path through the network, the first encryption key distribution path comprising a plurality of switches and links,” and “a data distribution endpoint configured to determine whether eavesdropping has occurred on the first encryption key distribution path using quantum cryptography, wherein the switch is further configured to establish a second encryption key distribution path through the network responsive to the eavesdropping determination, the second encryption key distribution path comprising a plurality of switches and links.”

As discussed above with respect to claim 1, MAYERS discloses the transmission of quantum signals over a single path between a source 103 and a measuring device 304, where source 103 may switch between channels for transmitting over the single path based on a detection of eavesdropping. MAYERS, thus, discloses a single “switch” (i.e., source 103) and a single path (i.e., point-to-point link between source 103 and measuring device 304). MAYERS does not, however, disclose a path that includes multiple switches and, therefore, does not disclose a “first encryption key distribution path comprising a plurality of switches...” or a

“second encryption key distribution path comprising a plurality of switches...,” as recited in claim 15. Since MAYERS does not disclose each and every feature of claim 15, MAYERS cannot anticipate claim 15. Withdrawal of the rejection of claim 15 under 35 U.S.C. § 102 is respectfully requested.

Independent claim 33 recites, among other features, “establishing a second path in the network responsive to the eavesdropping identification, wherein the second path comprises a different route through the network than the first path.” This feature is similar to the feature discussed above with respect to claim 1. Claim 33, therefore, patentably distinguishes over MAYERS for similar reasons to those set forth with respect to claim 1.

Independent claim 43 recites a “first key distribution path comprising a plurality of links and switches” and a “second key distribution path comprising a plurality of links and switches.” These features are similar to the features discussed above with respect to claim 15 above. Claim 43, therefore, patentably distinguishes over MAYERS for similar reasons to those set forth with respect to claim 15.

Independent claim 44 recites similar features to claim 33. Claim 44, therefore, patentably distinguishes over MAYERS for similar reasons to those set forth above with respect to claim 33.

On page 6, the Office Action rejections claims 2-8, 16-26 and 34-42 under 35 U.S.C. §103(a) as allegedly being unpatentable over MAYERS in view of DOVERSPIKE. Applicant respectfully traverses.

As one requirement for establishing a *prima facie* case of obviousness, the reference (or references when combined) cited by the Office Action must teach or suggest all of the claim features. *In re Vaeck*, 947 F.2d 488, U.S.P.Q.2d 1438 (Fed. Cir. 1991). See M.P.E.P. § 2143. A

further requirement for establishing a *prima facie* case of obviousness is that there must be some reason, suggestion, or motivation to combine reference teachings. Id. See M.P.E.P. § 2143.

Applicant submits that the Office Action has failed to establish a *prima facie* case of obviousness with respect to claims 2-8, 16-26 and 34-42.

In rejecting claims 2-4, the Office Action cites MAYERS and/or DOVERSPIKE as allegedly disclosing the various features of these dependent claims. Applicant submits, however, that the alleged teachings of MAYERS or DOVERSPIKE do not remedy the deficiencies in MAYERS noted above with respect to claim 1, from which claims 2-4 depend. Since MAYERS and DOVERSPIKE do not disclose all of the features of claims 2-4, the Office Action has failed to establish a *prima facie* case of obviousness with respect to these claims. Withdrawal of the rejection of claims 2-4 is, therefore, respectfully requested.

In rejecting claims 5 and 6, the Office Action admits that MAYERS does not disclose “wherein the first and the second path comprise a plurality of links and switches” (Office Action, pg. 9) The Office Action, however, cites DOVERSPIKE as allegedly disclosing this feature. Applicant submits that DOVERSPIKE does not remedy the deficiencies in MAYERS noted above with respect to claim 1, from which claims 5 and 6 depend. Amended claim 1 recites “establishing a second data distribution path through the network based on the eavesdropping determination, wherein the second data distribution path comprises a different route through the network than the first data distribution path.” As discussed above, MAYERS merely discloses switching between transmission on a first channel over a path to transmission on a second channel over the same path based on the detection of eavesdropping on the first channel. MAYERS does not disclose switching between different paths through the network based on an eavesdropping determination. DOVERSPIKE further discloses an optical network, in which a

subnetwork controller determines an alternate path through the optical network when a physical fault is detected by optical cross-connect (OXC) nodes in the network (see column 1, line 54 – column 2, line 11). As disclosed in the “fault types” of Table 3 of DOVERSPIKE (column 7), the physical faults that are detected and routed around consist of physical equipment failures, such as, optic interface port failures, operations channel failures, loss of signal failures, loss of frame failures, etc. DOVERSPIKE does not disclose, or even suggest, “establishing a second data distribution path through the network based on the eavesdropping determination, wherein the second data distribution path comprises a different route through the network than the first data distribution path,” as recited in claim 1. Therefore, since neither MAYERS nor DOVERSPIKE individually disclose such a feature, these references cannot be said to disclose such a feature in any reasonable combination. Since MAYERS and DOVERSPIKE, in any reasonable combination, do not suggest or disclose each and every feature of claim 1, from which claims 5 and 6 depend, a *prima facie* case of obviousness has not been established with respect to these claims. Withdrawal of the rejection of claims 5 and 6 is requested for at least this reason.

Applicant further submits that the Office Action has not provided a sufficient reason, suggestion or motivation for combining MAYERS and DOVERSPIKE. In rejecting claims 5 and 6, the Office Action (pg. 9) alleges “it would have been obvious to a person of ordinary skill in the art at the time of applicant’s invention to modify the key distribution method of MAYERS by including wherein the first and the second path comprises a plurality of links and switches as disclosed by DOVERSPIKE...because one of ordinary skill in the art would have motivated by the suggestion of DOVERSPIKE to provide for a reroute path that avoids the failed condition (i.e., eavesdropping) and restores communication within the network.” Applicant submits that DOVERSPIKE does not suggest providing a reroute path that avoids an eavesdropping



condition to restore communication within the network, as asserted by the Office Action. As discussed above, DOVERSPIKE merely discloses the determination of an alternate path through an optical network when a physical fault, that consists of optic interface port failures, channel failures, loss of signal failures, or loss of frame failures, occur in the network. DOVERSPIKE does not disclose, or even suggest, finding a reroute path through a network based on the detection of eavesdropping, as alleged by the Office Action.

Applicant further submits that the disclosure of DOVERSPIKE, which as indicated by the Office Action, is directed to providing a reroute path to restore communication within the network, is not applicable to eavesdropping within the context of a quantum cryptographic network. As one skilled in the art would recognize, eavesdropping in a quantum cryptographic network does not prevent quantum cryptographic communication. Eavesdropping merely enables an eavesdropper to detect the cryptographic key symbols being transmitted, without substantially disrupting communication across a quantum link. Therefore, the Office Action's characterization of DOVERSPIKE, as being directed to the determination of reroute paths for restoring communication within the network, is not applicable to quantum cryptographic communication. Since eavesdropping in a quantum cryptographic system does not substantially disrupt communication, one having ordinary skill in the art would not have been motivated to modify MAYERS with DOVERSPIKE to provide for a reroute path that restores communication, as alleged by the Office Action. Since the Office Action's alleged suggestion is not applicable to eavesdropping in a quantum cryptographic system, one having ordinary skill in the art would not have been motivated to modify the single path quantum cryptographic system of MAYERS with the network of DOVERSPIKE that consists of paths having multiple links and switches. The Office Action has, therefore, failed to establish a *prima facie* case of obviousness with respect to claims 5 and 6 for this additional reason.

Claims 7 and 8 depend from claim 6. Withdrawal of the rejection of claims 7 and 8 is requested for at least the reasons set forth with respect to claim 6 above.

Claim 16, as amended, recites “sending, from a data source node, a message requesting a path through the network, the request comprising identifiers of at least one of a link and a node in the network,” “setting up the path through the network, the path excluding the at least one of the link and the node in the network,” and “sending data from the data source node via the path.” In rejecting claim 16, the Office Action (pg. 7) admits that MAYERS does not disclose “requesting a path through the network, the request comprising identifiers of at least one of a link and a node in the network, and setting up the path through the network, the path excluding the at least one of the link and the node in the network.” The Office Action, however, cites DOVERSPIKE as allegedly disclosing these features. Applicant respectfully traverses and submits that Office Action has failed to establish a *prima facie* case of obviousness with respect to claim 16.

DOVERSPIKE discloses the identification of physical faults at optical cross-connect (OXC) nodes in a network and the flooding of fault messages from the OXCs to a subnetwork restoration controller (SRC) (column 1, line 38 – column 1, line 66; column 8, lines 44-48). Upon receipt of a fault message, the SRC ascertains a rerouting path that avoids the failed node/link in the network (column 2, lines 8-11). The SRC then sends a message to an OXC that defines a communication path between the SRC and the OXC that avoids the failed node/link in the network (column 9, lines 5-19). Each message sent from the SRC to an OXC includes the full node path (i.e., identifies each node in the path between the SRC and the OXC) (column 9, lines 21-28). Each intermediate node extracts the next node in the path between the SRC and a destination OXC from the full node path and forwards the message to this next node (column 9, lines 23-28). DOVERSPIKE, thus, discloses the determination of a reroute path around a fault

in a network and the transmission of messages between a subnetwork restoration controller (SRC) and optical cross-connect switches (OXC) that include identifiers of each node in the reroute path. The message sent from the SRC in DOVERSPIKE specifies the nodes in the actual path between the SRC and an OXC and does not include identifiers of links and/or nodes that are not included in the path between the SRC and the OXC. DOVERSPIKE, therefore, does not disclose "...a message requesting a path through the network, the request comprising identifiers of at least one of a link and a node in the network" and "setting up the path through the network, the path excluding the at least one of the link and the node in the network," as recited in amended claim 16. Since DOVERSPIKE does not remedy deficiencies in the disclosure of MAYERS, the combination of MAYERS and DOVERSPIKE does not disclose each and every feature of claim 16. Withdrawal of the rejection of amended claim 16 is, therefore, respectfully requested.

Applicant furthermore submits that the Office Action has not provided a sufficient reason, suggestion or motivation for combining the disclosure of MAYERS with the disclosure of DOVERSPIKE for the same reasons set forth above with respect to claims 5 and 6. Withdrawal of the rejection of amended claim 16 is requested for the additional reasons set forth above with respect to claims 5 and 6.

Claims 17-23 depend from claim 16. Withdrawal of the rejection of these claims is requested for at least the reasons set forth above with respect to claim 16.

Independent claims 24 and 25 recite similar features to those discussed above with respect to claim 16. Withdrawal of the rejection of these claims is, therefore, requested for similar reasons to those set forth above with respect to claim 16.

Independent claim 26 recites "a data distribution endpoint configured to request a path through the network, the request comprising identifiers of at least one of a link and a node in the

network” and “an optical switch configured to set up the path through the network, the path excluding the at least one of the link and the node in the network.” As discussed above with respect to claim 16, DOVERSPIKE discloses the determination of a reroute path around a fault in a network and the transmission of messages between a subnetwork restoration controller and optical cross-connect switches that include identifiers of each node in the reroute path. The message sent from the SRC in DOVERSPIKE sets forth the nodes in the actual path between the SRC and an OXC. The message sent from the SRC does not include identifiers of links and/or nodes that are not to be included in the path between the SRC and the OXC. DOVERSPIKE, therefore, does not disclose “a data distribution endpoint configured to request a path through the network, *the request comprising identifiers of at least one of a link and a node in the network*” and “an optical switch configured to set up the path through the network, *the path excluding the at least one of the link and the node in the network,*” as recited in claim 26. DOVERSPIKE, thus, does not remedy the deficiencies in MAYERS that are admitted by the Office Action (pg. 7). Since DOVERSPIKE does not remedy deficiencies in the disclosure of MAYERS, the combination of MAYERS and DOVERSPIKE does not disclose each and every feature of claim 26. Withdrawal of the rejection of amended claim 26 is, therefore, respectfully requested.

Applicant furthermore submits that the Office Action has not provided a sufficient reason, suggestion or motivation for combining the disclosure of MAYERS with the disclosure of DOVERSPIKE for the same reasons set forth above with respect to claims 5 and 6. Withdrawal of the rejection of amended claim 26 is requested for the additional reasons set forth above with respect to claims 5 and 6.

In rejecting claims 34-36, the Office Action cites MAYERS and/or DOVERSPIKE as allegedly disclosing the various features of these dependent claims. Applicant submits, however, that the alleged teachings of MAYERS nor DOVERSPIKE do not remedy the

deficiencies in MAYERS noted above with respect to claim 33, from which claims 34-36 depend. Since MAYERS and DOVERSPIKE do not disclose all of the features of claims 34-36, the Office Action has failed to establish a *prima facie* case of obviousness with respect to these claims. Withdrawal of the rejection of claims 34-36 is, therefore, respectfully requested.

Claims 37 and 38 recite similar features to those discussed above with respect to claims 5 and 6. Withdrawal of the rejection of claims 37 and 38 is requested for similar reasons to those set forth above with respect to claims 5 and 6.

Claims 39 and 40 depend from claim 38. Withdrawal of the rejection of claims 39 and 40 is requested for at least the reasons set forth with respect to claim 38 above.

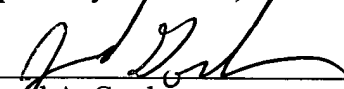
Claims 41 and 42 depend from claim 33. Withdrawal of the rejection of these claims is respectfully requested for at least the reasons set forth above with respect to claim 33.

In view of the above amendment, applicant believes the pending application is in condition for allowance.

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 18-1945, under Order No. BBNT-P01-139 from which the undersigned is authorized to draw.

Dated: June 30, 2005

Respectfully submitted,

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